

Packaging Software Assets for Reuse to Improve the Impact of Earth Science Information

Abstract

Earth science information can take many forms, such as data sets, imagery, maps, analytical reports, and the results of data analysis. Software and systems often contribute to the creation of Earth science information and the transformation of data into knowledge. For example, software may be used to access, read, process, and analyze data in order to obtain information that can then be published or used in decision-making. The reuse of existing software assets is becoming a more acceptable practice for improving the software development process and typically produces more robust tools. Therefore, software reuse can help maximize the impact of Earth science information.

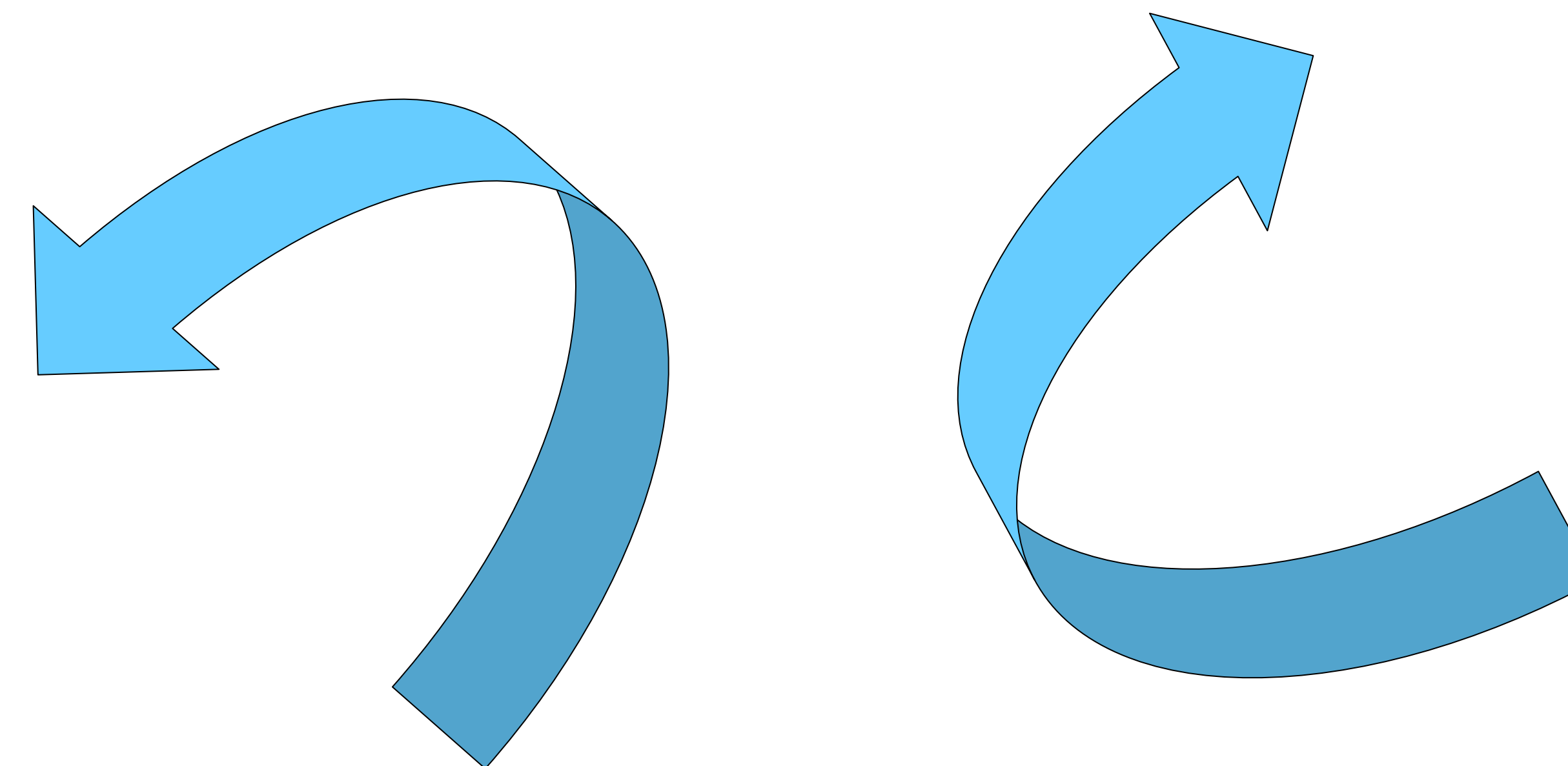
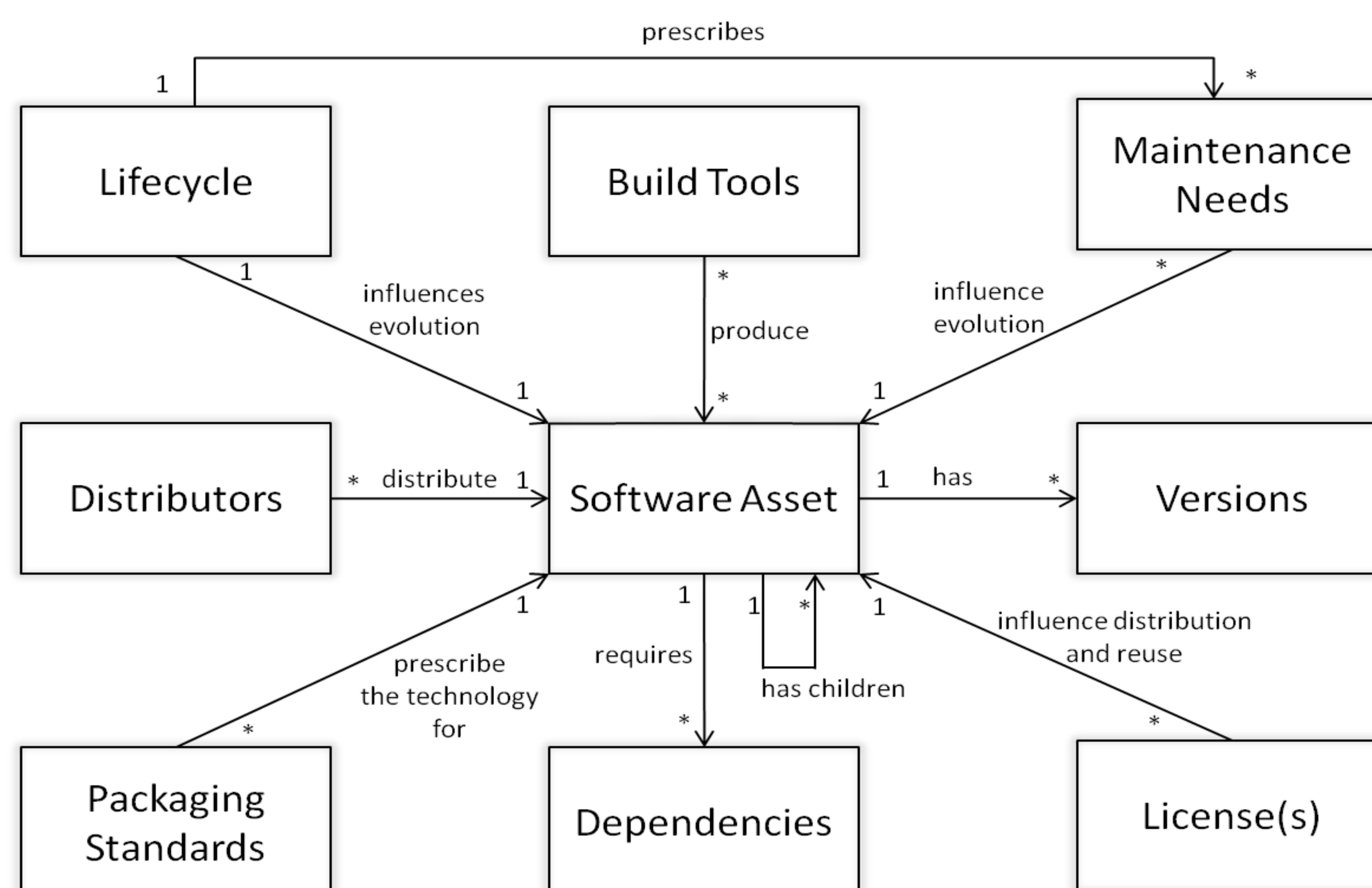
This poster presents some aspects of software packaging for reuse in the Earth sciences. Well-packaged software is generally more likely to be reused, providing benefits such as cost and/or time savings to developers, and less likely to need substantial customer technical support when reused. Here, we introduce a software packaging domain model and examine some existing software packaging methods and technologies. By being aware of factors such as this and incorporating reuse, from design to deployment, in software projects, developers can maximize their impact on the Earth science community.

Comparison of Some Packaging Standards and Technologies

Packaging Technology	Metadata Support	Pervasiveness	Domain of Use
<i>Red hat Package Manager (RPM)</i>	Difficult to add metadata other than the existing package metadata defined by RPM.	Used throughout RedHat Linux systems, and available on many UNIX systems as well.	Software Package Installation.
<i>Xml Formatted Data Units (XFDU)</i>	Any Metadata can be added with little effort. Metadata can be <i>per file</i> or <i>per package</i> , or both.	Emerging Standard, although recently used in DSMS prototype and at ESA.	Generic, meant to be used in any domain.
<i>Space Formatted Data Units (SFDU)</i>	Supports user-defined metadata attributes, and a base set of metadata.	Used by NSSDC as a packaging method for creating AIPs	Space Data Systems.
<i>ZIP</i>	Basic metadata such as file size, file modification date, etc. No support for adding metadata by default.	The de facto standard for compressing files.	Generic packaging technology.
<i>TAR</i>	File Header Block	Long legacy in Unix, Linux, Windows; GNU project	File / Software Packaging

Note: Please refer to Software Packaging for Reuse document (currently under development) for the more complete list of Packaging Technologies and Attributes, such as Ease of Use, Open Source, Developed by CCSDS?, Compression Method.

A software packaging domain information model



A survey of different software packaging methods/technologies. We are in the process of expanding this table to include more technologies, covering more operating systems (the current survey is *nix-oriented) and technologies that are not open source.

A software packaging domain information model. Boxes represent concepts (attributes) relevant to the software package. Lines indicate a particular relationship – labels on the lines spell out the relationship type, and arrows indicate the directionality of the relationship. Cardinality of the relationship is indicated by a “1” indicating a 1-to-1 relation, or by a “*” indicating a 1-to-many relation.

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